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LEHIGH VALLEY MEDICAL MAGAZINE.

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No. 4.

ORIGINAL ARTICLES.

A CASE OF PENETRATING BULLET WOUND OF THE CRANIUM.

Clinical Notes by W. P. WALKER, M.D., with remarks upon the case,
by W. L. ESTES, A.M., M.D.

C. D., a girl, aged 12 years. About four hours before admission the child was accidentally shot in the forehead by a playmate. The weapon was a pistol, carrying a .22-short cartridge. A dressing was applied and the patient sent to the hospital. On admission January 5th, 7 P.M., examination shows a fairly well-grown and well-nourished child; she is conscious, replies when questioned, but seems slightly stupid unless aroused, seems to have but little pain. Inspection shows a wound on the right side, three centimeters above the superciliary ridge and on a vertical line drawn through the outer canthus of the eye. The ball before striking had turned, so that it struck the forehead sidewise. There is no hemorrhage, but slight escape of brain tissue is present. The direction taken by the bullet seems to be downward, inward, and backward.

The child is somewhat pale, heart action is irregular, no murmurs, pulse of fair quality (80 per minute), respiration negative, pupils equal and react, no paralysis, lungs, liver, and spleen negative; urine, specific gravity 1029, clear, albumin and sugar absent.

The wound and surrounding parts were cleansed and an antiseptic dressing applied. The child had a comfortable night, sleeping most of the time. Slight twitching of the muscles of the right leg was noticed. At midnight, the temperature was 100° by axilla; pulse 80, quite irregular; respirations

20. January 6th, 9 A.M., temperature 98.4°; pulse 69, irregular; respirations 21. Patient has frontal headache, is stupid but will answer when spoken to loudly, is slightly irritable when aroused. No paralysis.

On the morning of the 6th, about 24 hours subsequent to the injury, after the usual preparation for operation, the wound was enlarged; the skull was found to be perforated—cerebral tissue escaping. The opening through the bone was enlarged and the membranes were found rather badly lacerated, the ball having perforated sidewise, as before mentioned, and having carried through a number of bone splinters from the internal layer of the cranium. These bits of bone were found embedded in the brain at a depth of about six centimeters. A number of fragments were removed, as well as disintegrated brain matter, the cavity left being large enough to admit easily the index finger for six centimeters. The track of the ball was downward, backward, and toward the middle line. Reasonable exploration failed to locate it. The cavity was douched with saline solution, and much detritus washed out. It was found that an irregular area of the dura mater, about the size of one's thumb nail, had been destroyed, so the aperture was filled in with gold foil. Iodoform gauze-packing was placed over the foil and the scalp wound closed. At 5 P.M., temperature was 100.2°, pulse 64, respirations 28. During the early part of the night the child was rather restless, and was given sodium bromide, grains xx.

January 7th, 9 A.M., temperature 99.6, pulse 72, respirations 27. The heart action has become much steadier, the patient is quiet, does not speak unless loudly spoken to and requires the questions to be put several times before replying, sleeps the greater part of the time; some photophobia. The temperature remained practically normal from this time on. January 9th, the wound was dressed. There was some serous retention. The iodoform gauze was removed and all sutures, the wound having healed, except where the packing protruded. The mental condition remains unimproved, the child being quite stupid. The tongue is protruded to the right; no facial paralysis. January 10th, no change noted, except more marked deviation of the tongue. January 16th, the dressings were changed. The gold

foil was found displaced and there was bulging outward at the site of the dural wound, evidently caused by a hernia cerebri. The gold was removed and a gauze pad placed over the prominence. January 21st, the right pupil is larger than the left, reacts sluggishly, and there is slight relaxation of the muscles on the right side of the face. There is some incoordination of the right arm. On January 24th, the child complained of nausea and vomited several times; otherwise there was no particular change. By February 1st, the paralysis of the face muscles had increased slightly, there was more incoordination of the right upper extremity, and the child still remained quite stupid. The hernia cerebri has increased a little, is about the size of a marble. It was decided to operate for the relief of the hernia and on February 1st it was dissected from its bony and fibrous investments and replaced. The intracranial pressure was enormous. The aperture in the bone was filled in by a hard rubber plate, inserted just under the bony margin. February 2d, highest temperature 98.8°. The facial paresis is less marked and mental condition is better.

From this time on until discharge, February 19th, the child improved in every way. The facial paralysis disappeared entirely, and the child became as bright mentally as before the injury.

REMARKS.

Tolerance of the cerebrum to injuries is now so well-known that only remarkable examples of this, or some special feature in the injury or treatment make these cases particularly interesting and profitable to the profession at the present day. The case of the girl who was recently treated in St. Luke's Hospital, and whose clinical history is given by Dr. Walker is, I think, sufficiently remarkable as to the severity and extent of injury, and exhibits the good effect of returning and controlling a hernia cerebri so conclusively that I think it well worth reporting, and the careful consideration of general practitioners.

A .22-calibre bullet, at short range, penetrated the cranial cavity of the girl and, as is usual, made a fairly clean perforation of the external table of the cranium, but splintered the inner table and drove several sharp spicules of bone into the cerebrum; as

indicated in the notes, some of these spicules were found about six centimeters from the surface of the cranial walls, deep down in the cerebrum. The brain had a cylindrical lacerated area which led downward, inward, and backward. After carefully washing out the detritus, consisting of blood, lacerated brain tissue, and pieces of bone, with a hot normal saline solution by means of an irrigator, a cavity was left which easily admitted my index finger and with this finger and probes I sought in vain for the bullet. My finger passed into the cerebrum in the direction of, and almost to, the lateral ventricle and, while the lacerated area seemed to extend further, I was unwilling to follow it because of the danger of penetrating into the lateral ventricle. Exploration by probe and grooved director was done in every direction around the lacerated area and as deep down towards the corpus striatum as I thought at all safe and expedient, but I could not find the bullet. After carefully washing out the cavity again with a gentle stream of saline solution, closure of the cranial cavity was next undertaken. The membranes were entirely destroyed, so I replaced them by some layers of thick gold foil which I attempted to anchor by inserting it under the inner table and fitting it into the irregularities of the bone; this was difficult to do, as the opening had been enlarged by rongeur forceps and was rather small, and was decidedly irregular. A bit of iodoform gauze was laid over this foil to give it stability; the end was brought out at the external angle of the wound. Then the scalp was brought over this and sutured. After this a compress of iodoform gauze was applied, and over all an aseptic dressing. Capillary drainage was employed at the external angle of the wound by means of the projecting end of the iodoform gauze piece over the gold foil.

The child bore the operation well and reacted quickly. She was somnolent, but seemed less stupid than before the operation. No special physical sign of paralysis or compression appeared until after the first dressing on the 9th, three days after the operation. At this dressing, the gauze piece, which was laid over and held down the gold foil, was removed, as well as the sutures in the scalp. The next day the child was quite stupid—she could be aroused, but lapsed quietly into somnolency. When her tongue

was protruded it deviated towards the right. Her condition remained about the same until the 16th when the second dressing was done. The wound in the scalp had healed, but there was a protrusion of the cerebral tissues through the opening in the cranium. Evidently the intracranial pressure had dislodged and driven the gold foil out of its place. Investigation showed this to be true, and as the foil was doing no good it was removed through a small opening made between the flaps for this purpose. The hernia cerebri was reduced and a compress of iodoform gauze placed over the opening in the bone to hold it in, and this was bandaged firmly in place. Her condition continued practically unaltered until January 21st, when it was noted that the right pupil was larger than the left, and that it reacted very sluggishly to light; there was also slight paresis of the right side of the face, and there was some incoordination of the muscles of the right upper extremity. By the 26th, the face was decidedly paralyzed on the right side, and the incoordination in the right upper extremity and the right deviation of the tongue were increased; the child began to vomit occasionally and her mental condition was worse. It was impossible to obtain the hernia by the means we were trying to employ, *viz.*, compresses and bandages, and the hernia was becoming steadily larger. It was evident something further must be done. The child had grown quite weak. I thought her condition did not admit of another extensive operation; there were no signs to indicate a definite location of the bullet. I decided to try to replace and retain the prolapsed brain tissue.

On February 1st, 25 days after the first operation, I separated the scalp from the hernia and the hernia from the bony perimeter of the cranial opening by a careful dissection and pressed the protrusion back into the cranial cavity. I found the intracranial pressure remarkably strong, so great was it that I suspected some fluid—serum or pus—beneath the opening, but I could find no evidence of it, other than the extreme pressure. I had prepared and sterilized a piece of flat flexible rubber, such as is used by dentists for taking impressions and making plates for teeth; I placed this over the hernia and slipped its edges under the bone, around the whole opening, and care-

fully pressed it down upon the hernia. The flexibility and plasticity of the rubber was sufficient to make it easily adapted to the opening and the surroundings, and when it was properly flattened out it was quite stiff enough to hold the hernia solidly in place. The scalp was sutured and the usual dressings applied. No drainage was used.

There was almost immediate improvement in the condition of the child. In a few days the facial paralysis was almost gone, the deviation of the tongue improved, and the incoordination disappeared, and the child became bright and cheerful; vomiting ceased. She left the hospital on February 19th, walking without difficulty, no paralysis, no incoordination, cheerful, and apparently as bright as she had ever been.

Many satisfactory points are brought out by this child's case:

(1) A very extensive wound of the cerebrum may have careful and prolonged and extensive investigation without bad results, provided asepsis be maintained.

(2) A physiological manifestation, namely, a right side paralysis with an extensive injury of the second cerebral convolution on the right side, from a bullet track toward the right corpus striatum.

(3) All paralytic manifestations disappeared, and the mental faculties returned by replacement and proper control of the hernia cerebri. The former and usual treatment of a hernia cerebri was excision of the protruding "knuckle" or nodule of the brain. I found the rubber plate an excellent expedient for closing the cranium. It is not an original expedient at all, but one to be recommended.

The probabilities are, inasmuch as the motor areas were so much involved, that epileptic attacks will occur later on. The case will be watched for any manifestation of this kind.

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PUBLISHING COMMITTEE:

W. L. ESTES, M.D., Chairman. W. P. WALKER, M.D., Secretary.

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Correspondence relating to articles and letters for publication books, and articles for review, etc., should be addressed to Dr. W. P. Walker, Editor, 315 Cherokee Street, South Bethlehem, Pa.

Communications relating to advertisements to Dr. W. H. Dudley, Business Manager, Easton, Pa.

Correspondence regarding subscriptions and other business to Dr. Charles McIntire, Treasurer, 104 North Fourth Street, Easton, Pa.

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EDITORIAL.

Anent Fees.—That “the laborer is worthy of his hire,” is a sentiment which has received the approval of the Great Physician Himself. That too often the worthy physician fails to receive a just recompense for his services is proved by the universal experience of the craft. That because of this, many fall by the wayside, and make use of methods not to be commended, is too common an observation to require demonstration. That the method of estimating the pecuniary value of the physician’s service is the same as has prevailed among the profession for centuries is another statement that will be accepted by all. That during this time, the entire methods of transacting business and regulating charges have been changed, most students of history admit. That the present age is an age of intense commercialism whose processes have made inroads upon professional methods likewise may be accepted as self-evident. One of these invasions that has attracted the attention of the profession of late, is

